January 1996

Mathematics 30

Grade 12 Diploma Examination

Alberta
EDUCATION

January 1996

Mathematics 30

Grade 12 Diploma Examination

Description

Time: 2.5 h. You may take an additional 0.5 h to complete the examination.

This is a **closed-book** examination consisting of **three** parts:

Part A
has 40 multiple-choice questions

Part B
has 9 numerical-response questions

Parts A and B are worth 70% of the examination

Part C
has 3 written-response questions, each worth 10% of the examination

A tear-out formula sheet and a z-score page are included in this booklet.

All graphs on this examination are computer-generated.

Instructions

- Fill in the information required on the answer sheet and the examination booklet as directed by the presiding examiner.
- You are expected to provide your own scientific calculator.
- Carefully read the instructions for each part before proceeding.
- The presiding examiner will collect your answer sheet and examination booklet and send them to Alberta Education.
- Do not fold the answer sheet.

Note: *The perforated pages at the back of this booklet may be torn out and used for your rough work.* ***No marks*** *will be given for work done on the tear-out pages.*

Part A: Multiple Choice

40 Questions

Instructions

- Consider all numbers used in the questions to be **exact real** numbers and not the result of a measurement.
- Read each question carefully and decide which of the choices **best** completes the statement or answers the question.
- Locate that question number on the separate answer sheet provided and fill in the circle that corresponds to your choice.

  Example

  This diploma examination is for the subject of

  A. biology
  B. physics
  C. chemistry
  D. mathematics

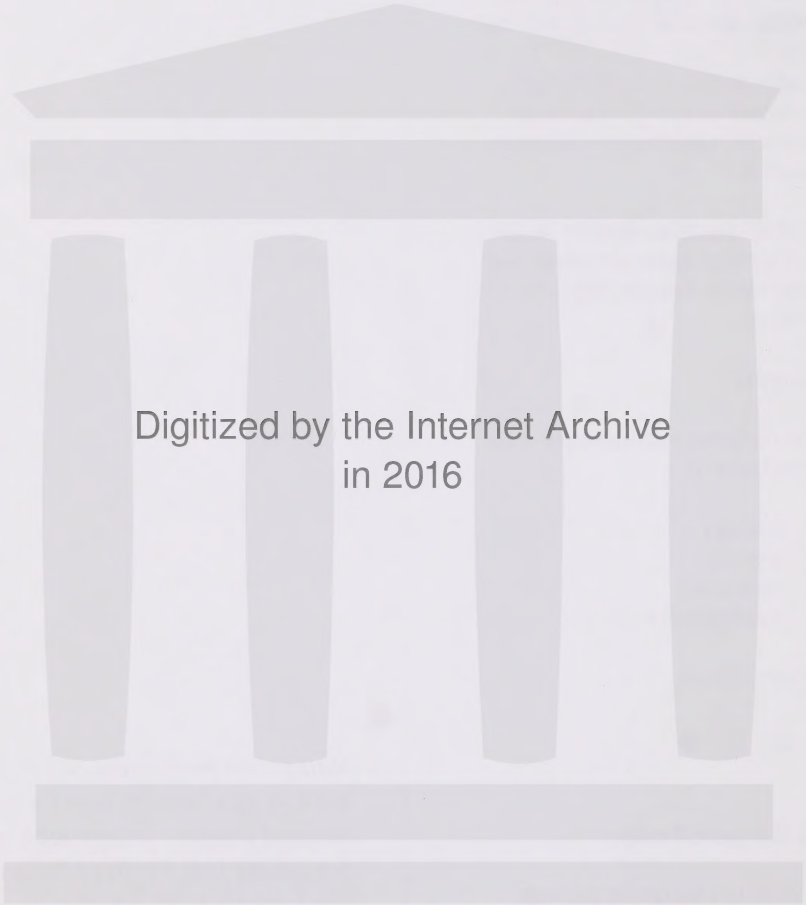
  Answer Sheet

  Ⓐ Ⓑ Ⓒ ●

- **Use an HB pencil only.**
- If you wish to change an answer, erase **all** traces of your first answer.

Note: *The perforated pages at the back of this booklet may be torn out and used for your rough work.* ***No marks*** *will be given for work done on the tear-out pages.*

Do not turn the page to start the examination until told to do so by the presiding examiner.



1. If $P(x) = 6x^3 - 5x^2 - 17x + 6$ and $P(2) = 0$, then the factored form of $P(x)$ is equal to

A. $(x + 2)(3x - 1)(2x + 3)$

B. $(x - 2)(3x - 1)(2x + 3)$

C. $(x - 2)(3x + 1)(2x - 3)$

D. $(x + 2)(3x + 1)(2x - 3)$

2. When the polynomial $P(x) = x^3 - 4x^2 + 12$ is divided by $x - 5$, the remainder is

A. 0

B. 12

C. $P(-5)$

D. $P(5)$

3. The factors of the polynomial $P(x) = 6x^3 + x^2 - 10x + 3$ are $(2x + 3)$, $(3x - 1)$, and $(x - 1)$. If the polynomial $P(x)$ is multiplied by -2, then the result is the polynomial $H(x) = -12x^3 - 2x^2 + 20x - 6$. The zeros of $H(x)$ are

A. $-\frac{3}{2}, \frac{1}{3}$, and 1

B. $\frac{3}{2}, -\frac{1}{3}$, and -1

C. $-3, \frac{2}{3}$, and 2

D. $3, -\frac{2}{3}$, and -2

4. If -1, 0, 2, and 4 are the zeros of a family of fourth-degree polynomial functions, every member of this family may be written as

A. $P(x) = ax(x - 1)(x + 2)(x + 4),\ a \neq 0$

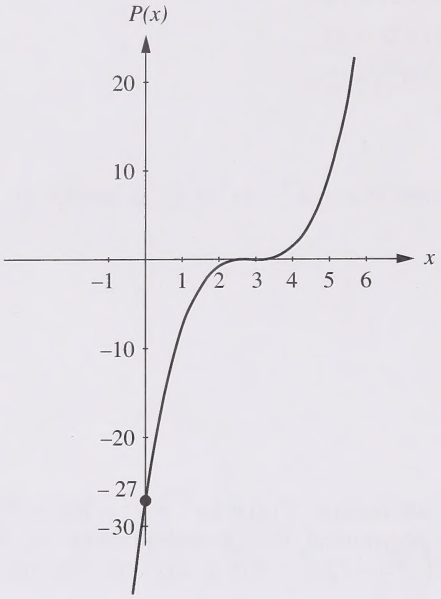
B. $P(x) = a(x - 1)(x + 2)(x + 4),\ a \neq 0$

C. $P(x) = ax(x + 1)(x - 2)(x - 4),\ a \neq 0$

D. $P(x) = ax^2(x + 1)(x - 2)(x - 4),\ a \neq 0$

Use the following information to answer the next question.

The graph of a third-degree polynomial function $P(x) = (x - 3)^3$ is shown below.



5. If another polynomial function $Q(x) = kP(x)$, $k > 1$, then the graph of $Q(x)$ must have

A. one more x-intercept than the graph of $P(x)$

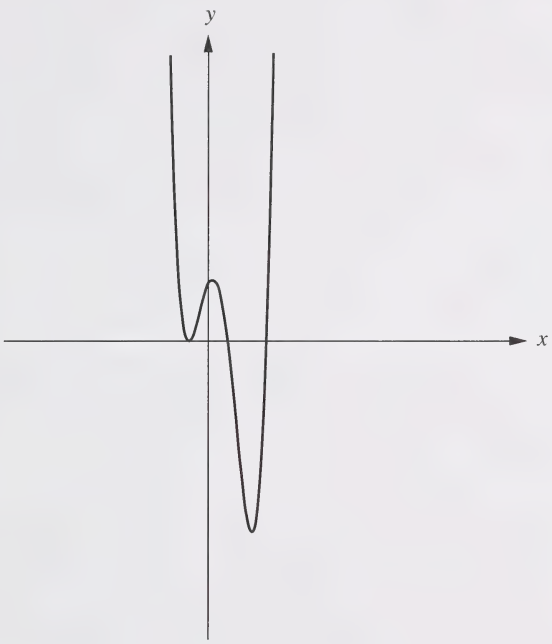
B. different x-intercepts than the graph of $P(x)$

C. a y-intercept that is greater than -27

D. a y-intercept that is less than -27

Use the following information to answer the next question.

The graph of a fourth-degree polynomial function $y = P(x)$ is shown below.



6. If $P(x) = 0$ has exactly three different solutions, the only statement about the roots of $P(x) = 0$ that is **true** is

A. two are real and positive, and two are not real

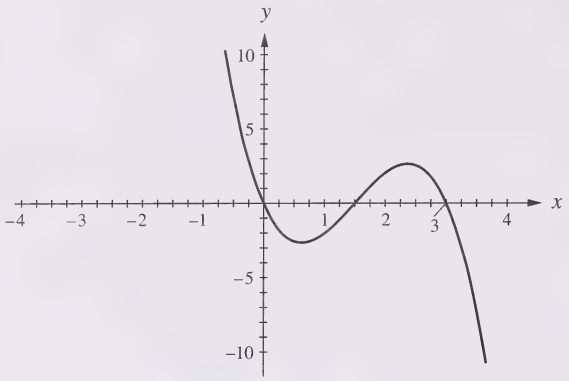
B. two are real and negative, and two are not real

C. two are real, equal and positive, and two are real, not equal and negative

D. two are real, positive and not equal, and two are negative and equal

Use the following information to answer the next question.

The graph of $y = -x(2x - 3)(x + n)$, $n \in I$, is shown below.



7. The value of n is

A. -3

B. $-\frac{3}{2}$

C. $\frac{3}{2}$

D. 3

8. The expression $\dfrac{\sec \theta}{\cot \theta \tan \theta}$ is equivalent to

A. $\dfrac{1}{\sin \theta}$

B. $\sin \theta$

C. $\cos \theta$

D. $\dfrac{1}{\cos \theta}$

9. To illustrate the identity $\cos\left(\theta - \dfrac{\pi}{2}\right) = \sin \theta$, a student could show that the graph of $f(\theta) = \sin \theta$ is the graph of $g(\theta) = \cos \theta$ shifted

A. $\dfrac{\pi}{2}$ units left

B. $\dfrac{\pi}{2}$ units right

C. $\dfrac{\pi}{2}$ units upward

D. $\dfrac{\pi}{2}$ units downward

Use the following information to answer the next question.

The equation of a trigonometric function is

$$h(\theta) = a \sin\left(\theta + \frac{\pi}{2}\right) - 4, \quad a > 0$$

10. An expression that defines the range of this function is

A. $-a \leq h(\theta) \leq a$

B. $-4a \leq h(\theta) \leq 4a$

C. $-a - 4 \leq h(\theta) \leq a - 4$

D. $-a + 4 \leq h(\theta) \leq a + 4$

---

11. If $\sin\theta \neq 0$, $\cos\theta \neq 0$ and $\dfrac{x \cos\theta \tan\theta}{3 \sec\theta \cot\theta} = 6$, then x is equal to

A. $\sin\theta$

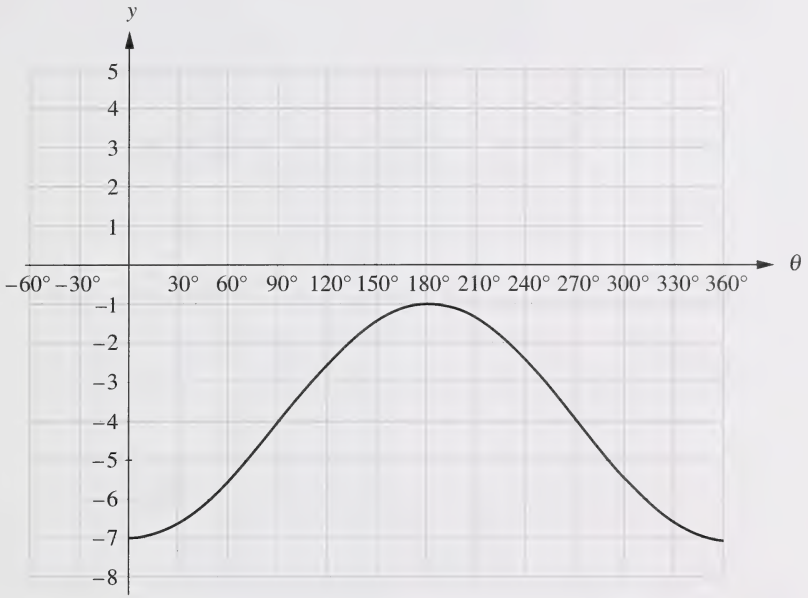
B. $\cos\theta$

C. $18 \csc^2\theta$

D. $18 \sec^2\theta$

Use the following information to answer the next question.

If the graph of $y = \cos\theta$ has a change in amplitude and a vertical translation, the equation becomes $y = a\cos\theta + d$, where $a, d \in N$ and $0° \leq \theta \leq 360°$. The graph of $y = a\cos\theta + d$ is shown below.



12. The amplitude and the downward vertical translation, respectively, are

A. 6 and 2
B. 6 and 4
C. 3 and 2
D. 3 and 4

13. If point $P(\pi, -6)$ lies on the graph of $h(\theta) = a \sin\left(\theta + \frac{\pi}{2}\right) - 4$, then the value of a is

A. 2

B. 4

C. 6

D. 10

14. The values of θ, $0 \leq \theta < 2\pi$, that satisfy $2 \sin^2 \theta = \sin \theta$ are

A. $\frac{\pi}{6}, \frac{5\pi}{6}$

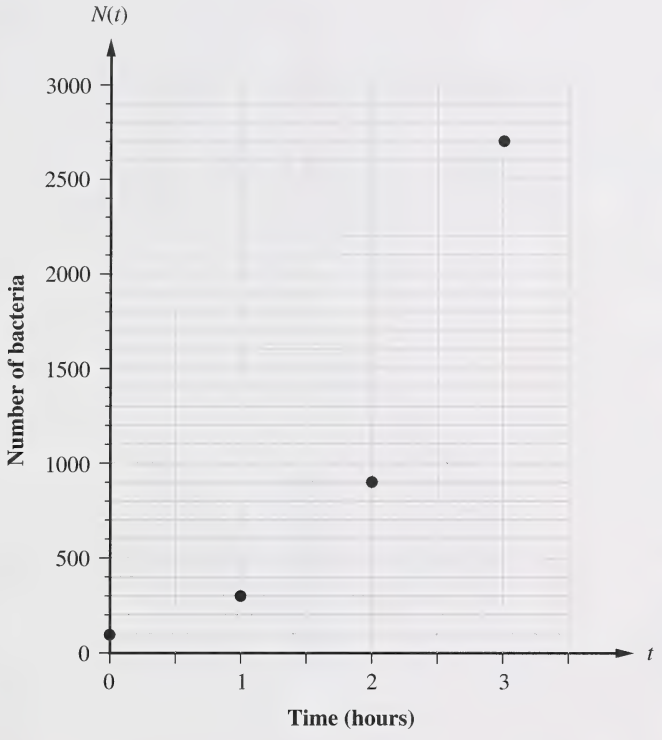
B. $\frac{7\pi}{6}, \frac{11\pi}{6}$

C. $0, \frac{\pi}{6}, \frac{5\pi}{6}, \pi$

D. $0, \pi \frac{7\pi}{6}, \frac{11\pi}{6}$

Use the following information to answer the next question.

The graph of the number of bacteria in a culture counted at $t = 0, 1, 2, 3$ is shown below.



15. An exponential function of the form $N(t) = N_0(k)^{at}$, where N_0, k, and a are natural numbers, that fits the experimental data is

A. $N(t) = 100(2)^t$

B. $N(t) = 100(3)^t$

C. $N(t) = 100(3)^{2t}$

D. $N(t) = 100(2)^{3t}$

16. If $3 \log_2 x = 12$, then x is equal to

A. 16
B. 8
C. 4
D. 2

17. The y-intercept of the graph of $y = \log_3(x + 2)$ is

A. 2
B. 0.631
C. –1
D. –1.76

18. If $W = 16^m \times 8^{2m-1}$, then $\log_2 W$ is equal to

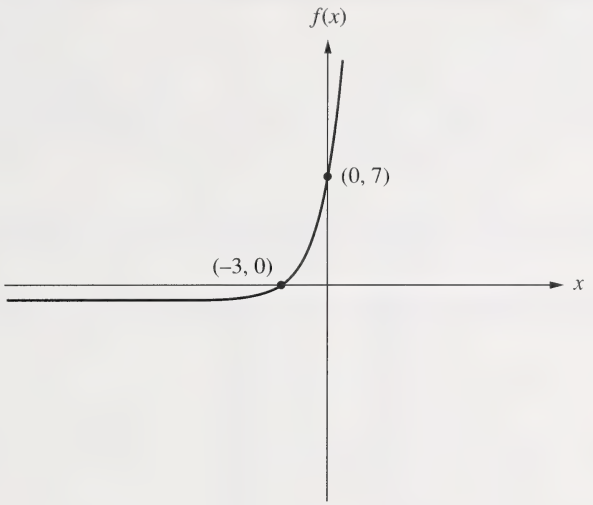
A. $3m - 1$
B. $10m - 1$
C. $10m - 3$
D. 10^{3m-1}

19. If $B > 0$, $C > 0$, and $A = B^2C$, then $\log_{10}(C)$ is equal to

A. $2 \log_{10}(B) - \log_{10}(A)$
B. $\log_{10}(A) - 2 \log_{10}(B)$
C. $\log_{10}(2B) - \log_{10}(A)$
D. $\log_{10}(A) - \log_{10}(2B)$

Use the following information to answer the next question.

The graph of the exponential function $f(x) = 2^{x+3} - 1$ is shown below.



20. If $g(x)$ is the inverse of $f(x)$, then the domain of $g(x)$ is

A. $x > -1$
B. $x > 0$
C. $x > 1$
D. $x \in \Re$

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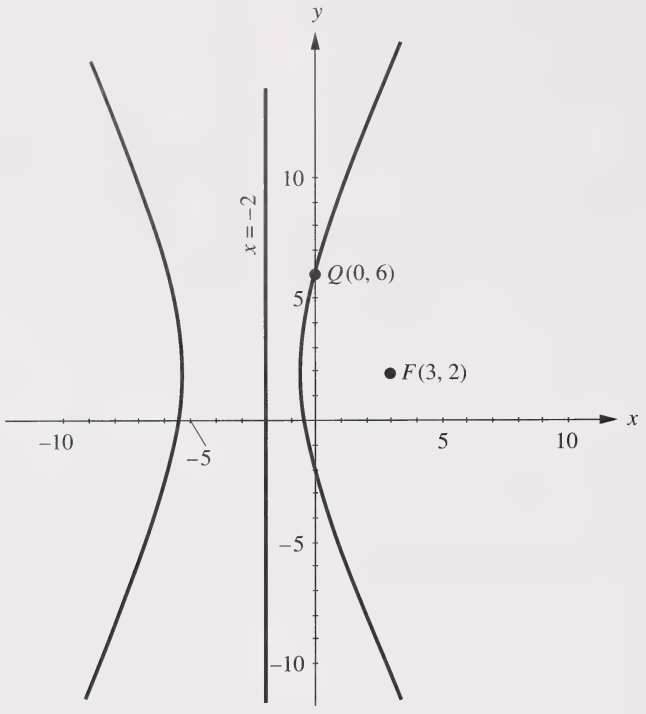
21. If $\log_3 x = 2$ and $\log_2 y = x$, then y is equal to

A. 8
B. 9
C. 256
D. 512

Use the following information to answer the next question.

The graph of a quadratic relation that has a directrix $x = -2$, one focus at $F(3, 2)$, and passes through the point $Q(0, 6)$, is shown below.



22. The eccentricity of this quadratic relation is

A. $\frac{5}{2}$

B. $\frac{3}{2}$

C. $\frac{2}{3}$

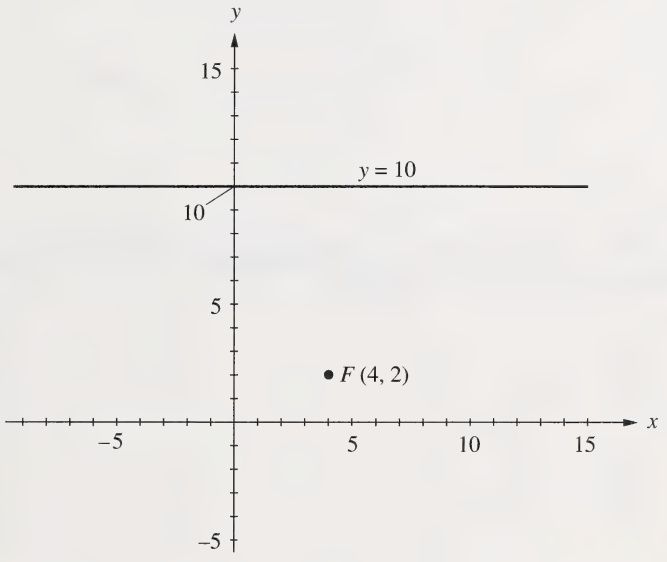
D. $\frac{2}{5}$

23. A given plane intersects both nappes of a given right circular conical surface. There are more than two different points of intersection. This intersection may form

A. a circle
B. an ellipse
C. a parabola
D. two intersecting lines

Use the following information to answer the next question.

The directrix and focus of a parabola are $y = 10$ and $F(4, 2)$, as shown below.

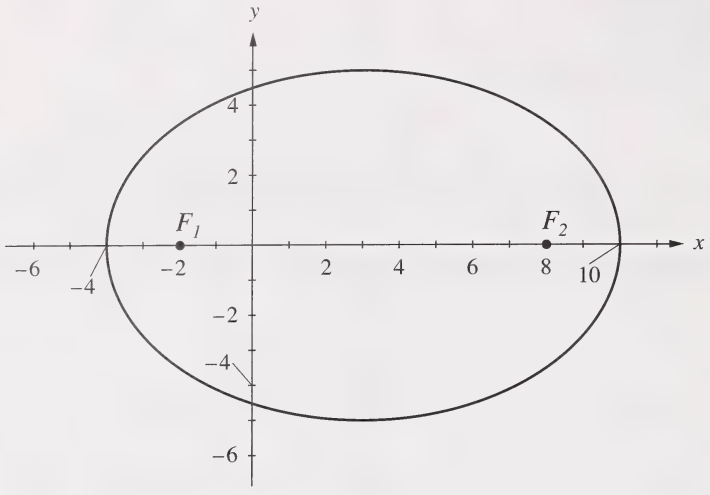


24. If the point (x, y) lies on the graph of this parabola, then the maximum value of y is equal to

A. 4
B. 5
C. 6
D. 7

Use the following information to answer the next question.

The foci of an ellipse are $F_1(-2, 0)$ and $F_2(8, 0)$. The ellipse passes through the points $(-4, 0)$ and $(10, 0)$, as shown below.



25. If point P lies on the ellipse and if the distance from F_1 to P is 5, then the distance from F_2 to P is equal to

A. 11

B. 9

C. 7

D. 3

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26. The equation for a non-degenerate quadratic relation is $Ax^2 + Cy^2 + Dx + Ey + F = 0$. If A and C are equal, then the quadratic relation is the locus of a point P, which moves such that the

A. distance from a fixed point is constant

B. sum of the distances from 2 fixed points is constant

C. distances from a fixed point and a fixed line are equal

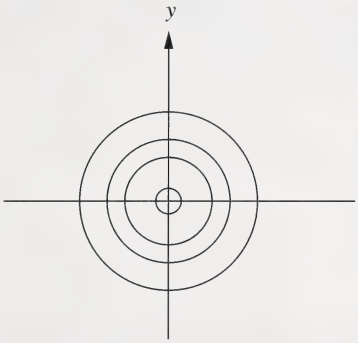
D. difference of the distances from 2 fixed points is constant

Use the following information to answer the next question.

Jacqueline is investigating quadratic relations defined by

$$Ax^2 + Cy^2 + Dx + Ey + F = 0.$$

The five parameters are A, C, D, E, and F. She keeps four of these parameters constant and changes one. The diagram below is a sketch of the graph that Jacqueline observes at the conclusion of her investigation.



27. In her investigation, Jacqueline changed parameter

A. C
B. D
C. E
D. F

28. The general term of a sequence is $t_n = 2(3^n),\ n \in N$. A recursive definition for this sequence is

A. $\begin{cases} t_1 = 6 \\ t_n = 3 \cdot t_{n-1},\ n > 1 \end{cases}$

B. $\begin{cases} t_1 = 6 \\ t_n = 6 \cdot t_{n-1},\ n > 1 \end{cases}$

C. $\begin{cases} t_1 = 3 \\ t_n = 3 \cdot t_{n-1},\ n > 1 \end{cases}$

D. $\begin{cases} t_1 = 3 \\ t_n = 6 \cdot t_{n-1},\ n > 1 \end{cases}$

29. The series $8 + 12 + 16 + 20 + 24$ may be written as

A. $\sum_{n=2}^{6} 4n$

B. $\sum_{n=1}^{6} (4n + 1)$

C. $\sum_{n=3}^{7} (3n - 1)$

D. $\sum_{n=2}^{5} (5n - 2)$

30. If $t_3 = 144$ and $t_6 = 486$ in a geometric sequence, then t_8 is equal to

A. 648
B. 656
C. 546.75
D. 1 093.5

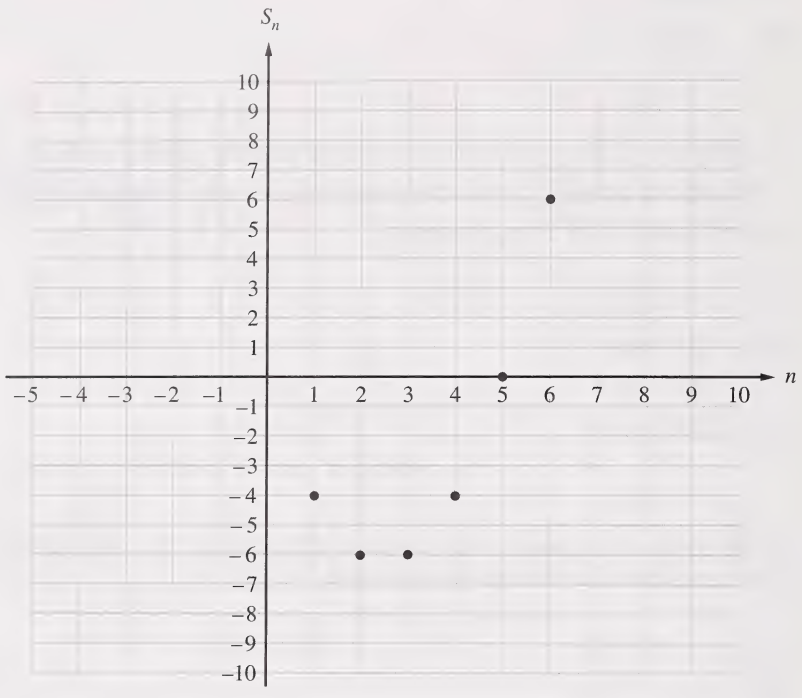
31. A tree grows 1.5 m during the first year of planting. During each subsequent year, the tree grows $\frac{9}{10}$ of the previous year's growth. When the growth of the tree since planting is 11.35 m, its age is

A. 4.8 years
B. 12.0 years
C. 13.4 years
D. 15.0 years

32. In an arithmetic sequence with a common difference of d, a necessarily **true** statement about the value of the tenth term, t_{10}, is

A. $t_{10} = t_4 + t_6$
B. $t_{10} = t_4 + 6d$
C. $t_{10} = t_4 + 5d$
D. $t_{10} = t_4 + t_5$

33. The graphical representation of the integer sum of the terms of an arithmetic sequence t_n, $n \in N$, is shown below. Each point on the graph is in the form (n, S_n), where $n \in N$ and S_n is the sum of the first n terms. For example, the point $(4, -4)$ represents $S_4 = -4$.



In this sequence, the term t_n, which equals zero, is

A. t_2

B. t_3

C. t_5

D. t_6

34. A bank card PIN code can consist of any four digits, and it is possible for a code to begin with zero. The probability that the PIN code begins with a 9 and ends with a 0 is

A. $\frac{1}{42}$

B. $\frac{1}{56}$

C. $\frac{1}{81}$

D. $\frac{1}{100}$

35. The number of different closed bracelets that can be made by using 9 beads, each of a different colour, is

A. $\frac{8!}{2}$

B. $8!$

C. $\frac{9!}{2}$

D. $9!$

36. The sixth row in Pascal's triangle is

$$1,\ 5,\ 10,\ 10,\ 5,\ 1$$

A problem that has the sum of the sixth row in Pascal's triangle as its solution is the number of ways that

A. 5 people can be arranged in a row

B. 6 people can be arranged in a row

C. 0, 1, 2, 3, 4, or all 5 people from a group of 5 people can be chosen

D. 0, 1, 2, 3, 4, 5, or all 6 people from a group of 6 people can be chosen

Use the following information to answer the next question.

There are 6 ways to arrange 3 people in a row. If the people are represented by the letters *A*, *B*, and *C*, then a model of these arrangements is shown below.

ABC	*BAC*	*CAB*
ACB	*BCA*	*CBA*

37. If these 3 people were arranged in a circle, then the total number of possible arrangements would be less than 6. Which of the following pairs from the model would represent the same circular arrangement?

A. *ABC* and *BAC*

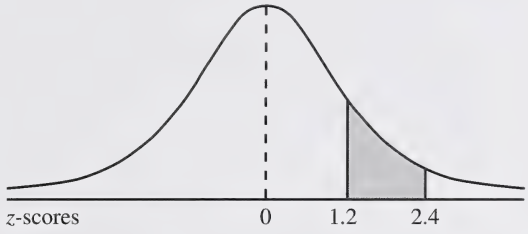
B. *ABC* and *ACB*

C. *BAC* and *CAB*

D. *BAC* and *CBA*

Use the following information to answer the next question.

The shaded area under the standard normal distribution curve shown below represents the probability that a certain event will occur.

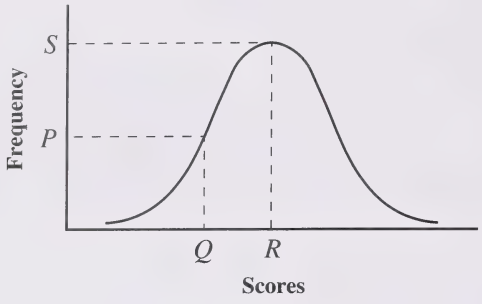


38. This probability is

A. 0.1069
B. 0.1233
C. 0.3849
D. 0.4918

Use the following information to answer the next question.

A normal distribution curve is shown below. The points (R, S) and (Q, P) lie on the curve. S is the maximum possible frequency and $P = \frac{S}{2}$.



39. Based on this data, the letter that represents the median score is

A. P
B. Q
C. R
D. S

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40. On a certain examination, the raw score results are normally distributed with a mean mark of 57 and a standard deviation of 11. Correct to the nearest hundredth, the z-score for a mark of 76 is equal to

A. 1.73
B. 0.46
C. –0.46
D. –1.73

You have now completed Part A. Proceed to Part B.

Part B: Numerical Response

9 Questions

Instructions

- Consider all numbers used in the questions to be **exact positive real** numbers and not the result of a measurement.
- Read each question carefully.
- Record your answer on the answer sheet provided by writing it in the boxes and then filling in the corresponding circles.
- **Enter the first digit of your answer in the left-hand box and leave any unused boxes blank.**
- Use an HB pencil only.
- If you wish to change an answer, erase **all** traces of your first answer.

Sample Questions and Solutions

Correct to the nearest tenth of a radian, 40° is equal to _____ rad.

$40° = 0.6981317008 \ldots$ rad

Record 0.7 on the answer sheet →

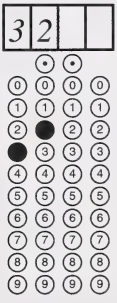
For the arithmetic series $-8 + (-5) + (-2) + \ldots + (85)$, the number of terms is _____.

$85 = -8 + (n - 1)(3)$

$93 = 3n - 3$

$n = 32$

Record 32 on the answer sheet →



Start Part B immediately.

1. The number of different arrangements of all the letters in the word **SCHOOL** is _____ .
(Record your answer on the answer sheet.)

2. If $5x + 6,\ 3x - 4,\ 2x + 3$ describe the first three terms of an arithmetic sequence, then, correct to the nearest tenth, the value of the common difference is _____ .
(Record your answer on the answer sheet.)

3. If the expansion of $(2x - 3)^n$ as a polynomial in x has 16 terms, then the value of n is equal to _____ .
(Record your answer on the answer sheet.)

4. When a polynomial $P(x)$ is divided by $x + 2$, the quotient is $4x^3 + 6$ and the remainder is 8. If $P(x) = ax^4 + bx^3 + cx^2 + dx + e$, then the value of e is _____ .
(Record your answer on the answer sheet.)

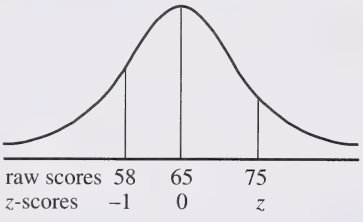
5. If $\log_2(2x - 3) = 3$, then correct to the nearest tenth the value of x is _____ .
(Record your answer on the answer sheet.)

6. In a school, student identification codes are made up using any letter, other than M, I, O, or F followed by any two digits. The number of students that can be assigned different identification codes is _____ .
(Record your answer on the answer sheet.)

7. The graph of an ellipse has a directrix of $x = 8$ and a corresponding focus at $(3, 0)$. If a point on the ellipse is $P(4, 0)$, then the value of its eccentricity correct to the nearest hundredth is _____ .
(Record your answer on the answer sheet.)

Use the following information to answer the next question.

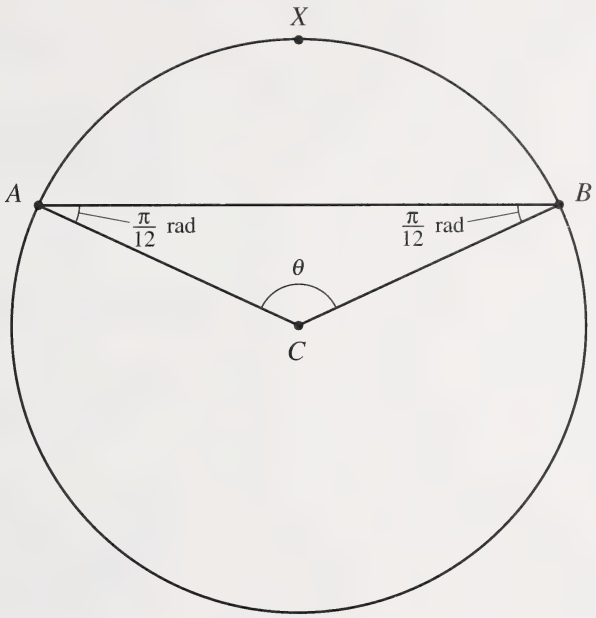
On a test, the raw-score results are normally distributed. The z-scores and corresponding raw scores are illustrated below.



8. The value of z, correct to the nearest hundredth, is _____ .
(Record your answer on the answer sheet.)

Use the following information to answer the next question.

A circle with centre C is shown below.



9. If the radius of the circle is 12 cm, then correct to the nearest tenth of a centimetre, the length of arc AXB is _____ .
(Record your answer on the answer sheet.)

You have now completed Part B. Proceed to Part C.

Part C: Written Response

3 Questions

Instructions

- Consider all numbers used in the question to be **exact real** numbers and not the result of a measurement.
- Read each question carefully.
- Write your answers in the examination booklet as neatly as possible.
- For full marks, your answers **must show all** pertinent explanations, calculations, and formulas.
- Your answers **should be** presented in a well-organized manner using complete sentences for a written response, and correct units for a numerical response.

Note: *The perforated pages at the back of this booklet may be torn out and used for your rough work.* ***No marks*** *will be given for work done on the tear-out pages.*

Start Part C immediately.

For Department Use Only

(10% of the examination)

1. In an arithmetic sequence, the first term is 84 and the common difference is –6. Find the two different values of n that satisfy $S_n = 612$. Explain why two different values for the number of terms can yield the same sum.

Written-response question 2 begins on the next page.

For Department Use Only

(10% of the examination)

2. Algebraically show why the **only** solutions to the equation $\log_x(19x - 30) = 3$ are $x = 2$ and $x = 3$.

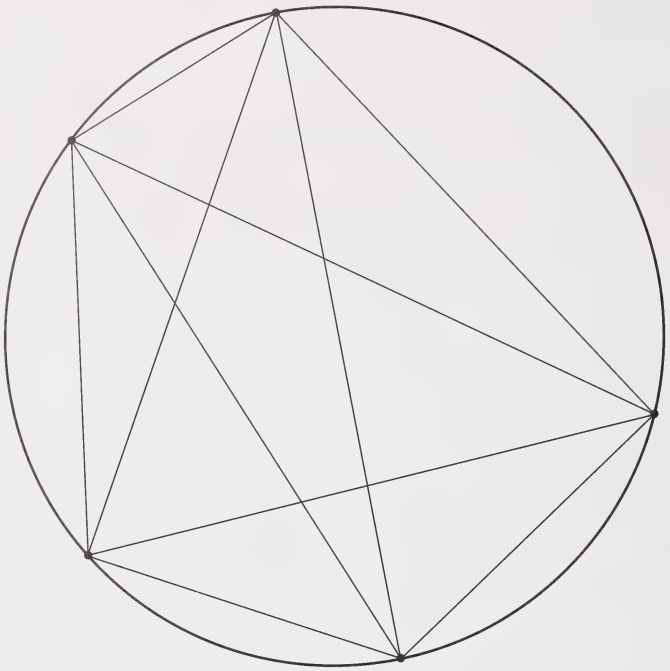
Written-response question 3 begins on the next page.

For Department Use Only

(10% of the examination)

Use the following information to answer the next question.

Five points are placed on the circumference of a circle. Each point on the circumference of the circle is joined with every other point, as shown below.



This model represents the number of ways 5 people can shake each other's hands once. The line joining 2 points represents the handshake.

3. Create another situation that can also be represented by this model. Explain **how** the model represents your situation.

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You have now completed the examination.
If you have time, you may wish to check your answers.

Mathematics 30 Formula Sheet

The following information may be useful in writing this examination.

- The roots of the quadratic equation $ax^2 + bx + c = 0$ are

$$x = \frac{-b \pm \sqrt{b^2 - 4ac}}{2a}$$

- The distance between two points (x_1, y_1) and (x_2, y_2) is

$$d = \sqrt{(x_2 - x_1)^2 + (y_2 - y_1)^2}$$

Quadratic Relations

- $e = \dfrac{|\overline{PF}|}{|\overline{PD}|}$

Trigonometry

- arc length $a = r\theta$
- $\sin^2 A + \cos^2 A = 1$
- $1 + \tan^2 A = \sec^2 A$
- $1 + \cot^2 A = \csc^2 A$
- $\csc A = \dfrac{1}{\sin A}$
- $\sec A = \dfrac{1}{\cos A}$
- $\cot A = \dfrac{\cos A}{\sin A}$
- $\sin(A + B) = \sin A \cos B + \cos A \sin B$
- $\cos(A + B) = \cos A \cos B - \sin A \sin B$
- $\sin(A - B) = \sin A \cos B - \cos A \sin B$
- $\cos(A - B) = \cos A \cos B + \sin A \sin B$

Permutations and Combinations

- ${}_nP_r = \dfrac{n!}{(n-r)!}$
- ${}_nC_r = \dfrac{n!}{r!(n-r)!}$
- In the expansion of $(x + y)^n$, the general term is $t_{k+1} = {}_nC_k x^{n-k} y^k$

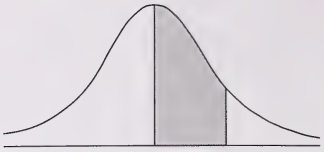
Sequences and Series

- $t_n = a + (n-1)d$
- $S_n = \dfrac{n[2a + (n-1)d]}{2}$
- $S_n = n\left(\dfrac{a + t_n}{2}\right)$
- $t_n = ar^{n-1}$
- $S_n = \dfrac{a(r^n - 1)}{r - 1}$, $r \neq 1$
- $S_n = \dfrac{rt_n - a}{r - 1}$, $r \neq 1$

Exponential and Logarithmic Functions

- $\log_a mn = \log_a m + \log_a n$
- $\log_a \dfrac{m}{n} = \log_a m - \log_a n$
- $\log_a m^n = n \log_a m$

$$z = \frac{x - \mu}{\sigma}$$



Areas under the Standard Normal Curve

z	0	1	2	3	4	5	6	7	8	9
0.0	0.0000	0.0040	0.0080	0.0120	0.0160	0.0199	0.0239	0.0279	0.0319	0.0359
0.1	0.0398	0.0438	0.0478	0.0517	0.0557	0.0596	0.0636	0.0675	0.0714	0.0754
0.2	0.0793	0.0832	0.0871	0.0910	0.0948	0.0987	0.1026	0.1064	0.1103	0.1141
0.3	0.1179	0.1217	0.1255	0.1293	0.1331	0.1368	0.1406	0.1443	0.1480	0.1517
0.4	0.1554	0.1591	0.1628	0.1664	0.1700	0.1736	0.1772	0.1808	0.1844	0.1879
0.5	0.1915	0.1950	0.1985	0.2019	0.2054	0.2088	0.2123	0.2157	0.2190	0.2224
0.6	0.2258	0.2291	0.2324	0.2357	0.2389	0.2422	0.2454	0.2486	0.2518	0.2549
0.7	0.2580	0.2612	0.2642	0.2673	0.2704	0.2734	0.2764	0.2794	0.2823	0.2852
0.8	0.2881	0.2910	0.2939	0.2967	0.2996	0.3023	0.3051	0.3078	0.3106	0.3133
0.9	0.3159	0.3186	0.3212	0.3238	0.3264	0.3289	0.3315	0.3340	0.3365	0.3389
1.0	0.3413	0.3438	0.3461	0.3485	0.3508	0.3531	0.3554	0.3577	0.3599	0.3621
1.1	0.3643	0.3665	0.3686	0.3708	0.3729	0.3749	0.3770	0.3790	0.3810	0.3830
1.2	0.3849	0.3869	0.3888	0.3907	0.3925	0.3944	0.3962	0.3980	0.3997	0.4015
1.3	0.4032	0.4049	0.4066	0.4082	0.4099	0.4115	0.4131	0.4147	0.4162	0.4177
1.4	0.4192	0.4207	0.4222	0.4236	0.4251	0.4265	0.4279	0.4292	0.4306	0.4319
1.5	0.4332	0.4345	0.4357	0.4370	0.4382	0.4394	0.4406	0.4418	0.4429	0.4441
1.6	0.4452	0.4463	0.4474	0.4484	0.4495	0.4505	0.4515	0.4525	0.4535	0.4545
1.7	0.4554	0.4564	0.4573	0.4582	0.4591	0.4599	0.4608	0.4616	0.4625	0.4633
1.8	0.4641	0.4649	0.4656	0.4664	0.4671	0.4678	0.4686	0.4693	0.4699	0.4706
1.9	0.4713	0.4719	0.4726	0.4732	0.4738	0.4744	0.4750	0.4756	0.4761	0.4767
2.0	0.4772	0.4778	0.4783	0.4788	0.4793	0.4798	0.4803	0.4808	0.4812	0.4817
2.1	0.4821	0.4826	0.4830	0.4834	0.4838	0.4842	0.4846	0.4850	0.4854	0.4857
2.2	0.4861	0.4864	0.4868	0.4871	0.4875	0.4878	0.4881	0.4884	0.4887	0.4890
2.3	0.4893	0.4896	0.4898	0.4901	0.4904	0.4906	0.4909	0.4911	0.4913	0.4916
2.4	0.4918	0.4920	0.4922	0.4925	0.4927	0.4929	0.4931	0.4932	0.4934	0.4936
2.5	0.4938	0.4940	0.4941	0.4943	0.4945	0.4946	0.4948	0.4949	0.4951	0.4952
2.6	0.4953	0.4955	0.4956	0.4957	0.4959	0.4960	0.4961	0.4962	0.4963	0.4964
2.7	0.4965	0.4966	0.4967	0.4968	0.4969	0.4970	0.4971	0.4972	0.4973	0.4974
2.8	0.4974	0.4975	0.4976	0.4977	0.4977	0.4978	0.4979	0.4979	0.4980	0.4981
2.9	0.4981	0.4982	0.4982	0.4983	0.4984	0.4984	0.4985	0.4985	0.4986	0.4986
3.0	0.4987	0.4987	0.4987	0.4988	0.4988	0.4989	0.4989	0.4989	0.4990	0.4990
3.1	0.4990	0.4991	0.4991	0.4991	0.4992	0.4992	0.4992	0.4992	0.4993	0.4993
3.2	0.4993	0.4993	0.4994	0.4994	0.4994	0.4994	0.4994	0.4995	0.4995	0.4995
3.3	0.4995	0.4995	0.4995	0.4996	0.4996	0.4996	0.4996	0.4996	0.4996	0.4997
3.4	0.4997	0.4997	0.4997	0.4997	0.4997	0.4997	0.4997	0.4997	0.4997	0.4998
3.5	0.4998	0.4998	0.4998	0.4998	0.4998	0.4998	0.4998	0.4998	0.4998	0.4998
3.6	0.4998	0.4998	0.4999	0.4999	0.4999	0.4999	0.4999	0.4999	0.4999	0.4999
3.7	0.4999	0.4999	0.4999	0.4999	0.4999	0.4999	0.4999	0.4999	0.4999	0.4999
3.8	0.4999	0.4999	0.4999	0.4999	0.4999	0.4999	0.4999	0.4999	0.4999	0.4999
3.9	0.5000	0.5000	0.5000	0.5000	0.5000	0.5000	0.5000	0.5000	0.5000	0.5000

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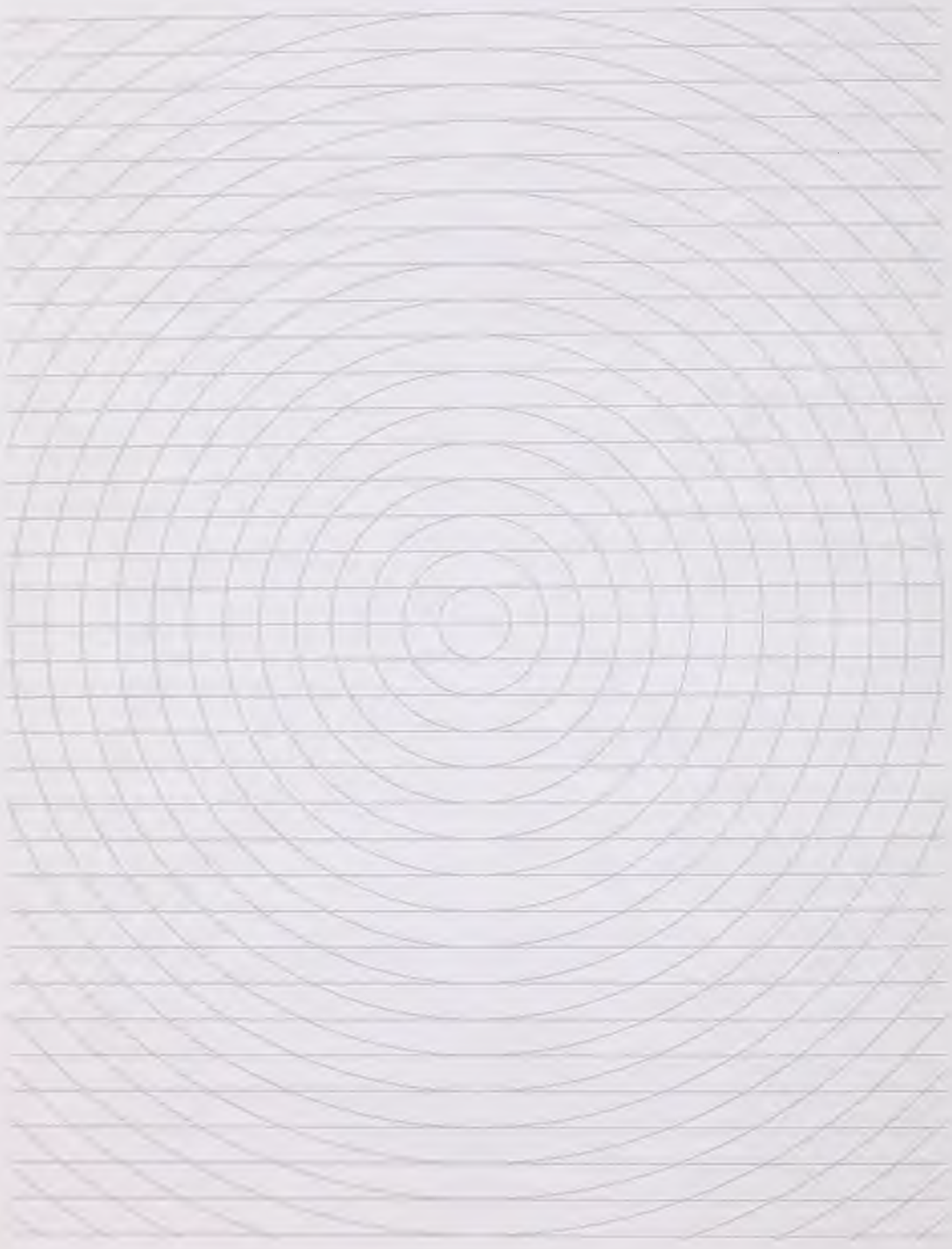

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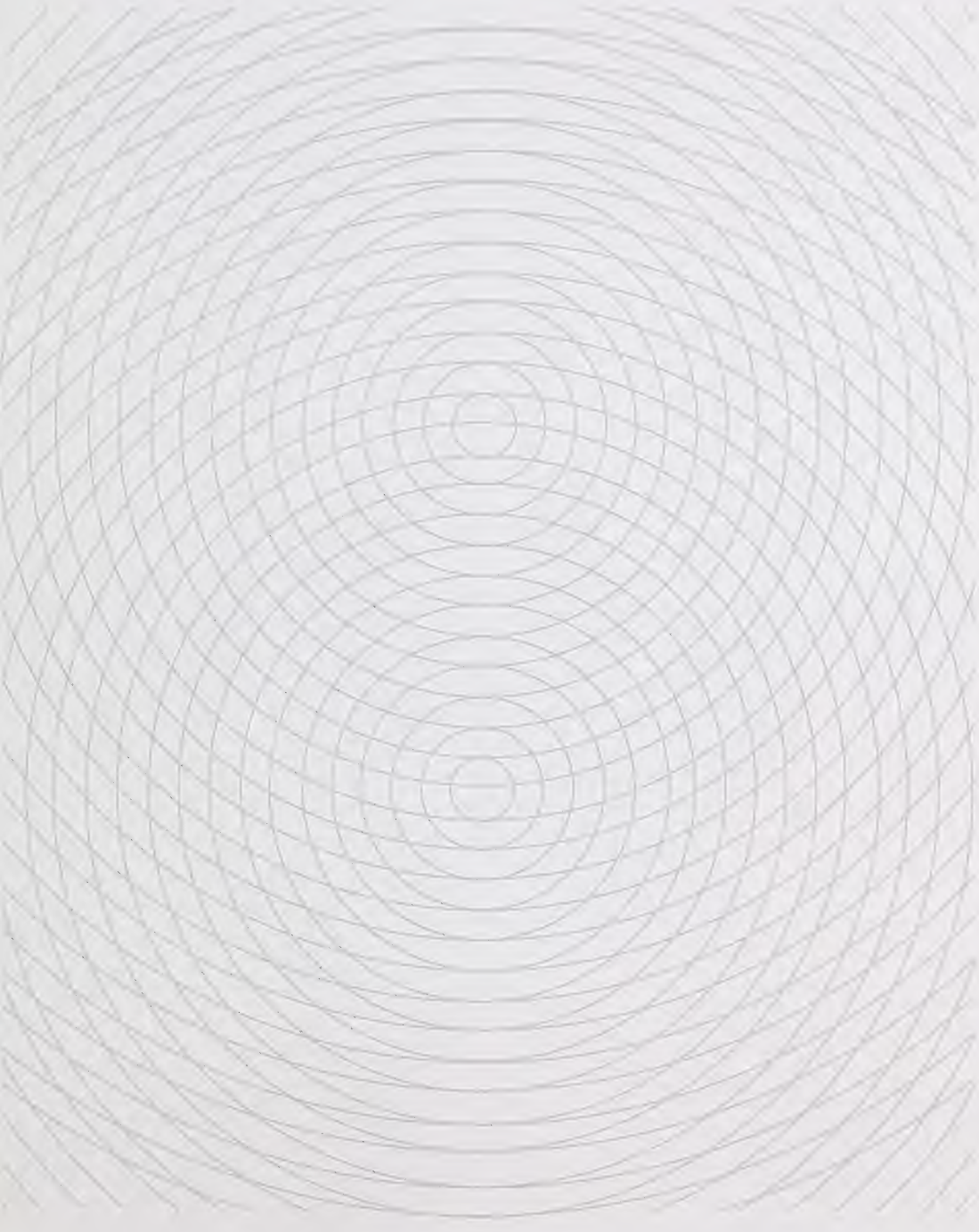

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Mathematics 30
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